

Impact of Workspace Design on Employee's Productivity; A Case Study of Public Sector Universities in Hazara Division

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ABSTRACT: *In today's business world, workspace design is one of most critical factor in for employee's productivity. Today's workplace is different, diverse, and constantly changing. Issues related to the workspace design significantly neglected in Pakistan. This is also affecting the employees' performance and results in delay in work completion, personal growth, and frustration etc. The purpose of this study was to find out the effect of workspace design i.e. furniture, noise, comfort, and spatial arrangement on employees' productivity and to examine the relationship between efficiency and surroundings space design of the employees. The study was conducted from a employees-based view to investigate the effect of workspace design an how employees perceives its effect on their performance? Primary data was collected using standardized questioners from employees of three public sector universities in Hazara division. Results demonstrated that the employees believe that effective workspace design will enhance their productivity.*

Keywords: *Workspace design; Employees' Productivity.*

The most important factor in keeping a worker contented in recent business world is workspace environment. The usual employer/employee relationship has been changed. Employees have almost infinite job opportunities as they are living in growing economies. Thus this blend of factors has resulted in creation of an environment where the workers are the need of business more than the workers need the business (Smith, 2011). The environment where worker performs his work is called as workspace (Chapins, 1995) and it directly influences the employee's productivity. The term used for the place where workers work is called as workspace design. It consists of the, office, surroundings cubicle, site of workplace or the mixture of all of them, and can be termed hostile, friendly positive, negative etc. It is quite obvious that the efficiency of the employs is enhanced worldwide in the institutions or organizations where the workspace design is friendly as compared to the socialization free conditions. Research has proved that the workspace design enormously affects the competency of the workers in an organization. Some researchers (e.g. Sundstrom at al., 1994) have also commented that the workspace design may also cause stress of the employees, e. g job of Police department is normally viewed as stressful job and the workspace design may also affects the efficiency of the performance mostly of the female officers (He, Zhao, & Archbold, 2002). Better workspace design leads to better outcome and increased productivity. Healthy physical space design improves the productivity of the employees by enhancing their efficiency. Multiple research works concluded that the factors such as congestion at work place and the physical space design contribute a lot in reducing employees' productivity (Carnevale 1992).

This research study is an attempt to quantify the impact of workspace design on employees productivity in Pakistan. Outside the country the stated problem has been addressed by the researchers by their research work; so the

purpose of the research is to focus the relationship between the workspace design and employees' productivity in the Pakistani context, most specific the higher education sector's employee in Hazara division.

Literature Review

A large number of work environment studies have revealed that workers are usually satisfied with some specific workspace features. These features are extremely important for enhancing productivity of workers. These features include lighting, ventilation rates, access to natural light and acoustic environment (Becker, 1981; Humphries, 2005; Karasek & Theorell, 1990). Employee's health is positively affected by Lighting and comfortable furniture.(Dilani, 2004; Milton, Glencross & Walters, 2000) and thus on productivity. This is so because light has a profound effect on worker's physical, physiological and psychological health and on their overall performance at the workplace. Ambient features in workspace environment, such as lighting, temperature, ventilation etc., suggest that these elements of the atmosphere affect employee's contentment, performance, behaviors, and thus productivity (Larsen, Adams, Deal, Kweon & Tyler, 1998; Veitch & Gifford, 1996).

The role that work plays in people's lives is considerable, with approximately a third of a person's time spent at work (Grant & Shields, 2006). This means a poor work environment has the potential to impinge upon an individual's wellbeing. Social and environmental psychology studies have shown that features of the physical atmosphere have profound impact on individual's attitude (Robertson et al., 2008). The tasks that people perform, the jobs and roles they hold, and the machines and interfaces they use do not exist in a vacuum. How effectiveness, safety, health, and satisfaction, are achieved will be affected by how well people fit with their physical workspace and physical work environment.

There are some serious issues surrounding the provision of healthy and efficient workplaces and environments. Di Martino and Corlett (1998) raise a few of these issues, such as the position from which an individual works (working zones, lines of sight, work heights); clearances (movement space, activity space); workstation layout (display and control positions, display-control relationships); and the physical environment (lighting, noise, climate, and space).

Researchers have establishing a focus on the ways in which the physical work environment impacts upon employee productivity, stress, satisfaction, and effectiveness (O'Neill, 2010; Robertson & Huang, 2006; Robertson, Huang, & Chang, 2004).

Modern workplaces evolved out of managerial concepts developed in the mid-1950s. While tools and electronic business initiatives have improved the speed of communication in the workplace, the physical layout of the workplace is still centered on the traditional concept of assigning individuals to specific spaces. Each member's workload and types of work are becoming more dynamic as the result of maintaining the same workload with fewer people in organizations. However, the spaces that members are assigned do not fully accommodate different types of workload. Is there a way to re-engineer traditional workplaces to meet the needs of employees' dynamic variety of tasks?

Due to the nature of today's work, members need various places to accomplish work and only reside in their assigned office space a fraction of the time (Ellis, 2014). Instead of organizations forcing a single work style on their employees, it is possible to give members of organizations the flexibility to align their work style to their organizational needs by leveraging today's technology (Ellis, 2014). For example, in urban planning, roads are not the sole means for transportation; sidewalks, railways, and bike paths are equally important to maximize capacity in the transportation

system. Similar logic can be applied to organizational workspaces; to efficiently negotiate their variety of tasks, individuals should have the ability to choose which combination of tools and physical spaces they need to accomplish work (Ellis, 2014). These workers have immediate access to their coworkers and can easily communicate and collaborate with them whether they are physically present in the same room or remote location (Ellis, 2014).

Taylor and Spicer (2007) argue there are three forms to organizational space: distance, power, and experience. When space is considered as a form of distance, spaces are organized around resource nodes with the goal to minimize the distance to these nodes for the best workspace layout. The "power" form focuses on how to organize spaces to enable surveillance and control of employees. Influences of the first two forms are obvious in the traditional workspaces. However, it is tough to see the third "experience" form in traditional organizational spaces as it explores how members encounter or interact with the workplace. Experience shows little concern for the former two forms and seeks to understand the decorations of a space and the meaning of walls. Aspects of "experience" are often difficult to quantify, but when spaces are developed out of this form, radically different spaces emerge. Hybrid workspaces focus on this "experience" to facilitate new improved working environments. Hughes and Bozionelos (2007) in a survey reported that workspace quality influence the behavior of employees, it is believed by nine out of ten workers increases their productivity. Chandraseker (2011) also confirm that insecure and detrimental workplace environment in terms of improper lighting, poor ventilation, extreme noise etc. affect workers health and productivity. Hameed and Amjad (2009) in a survey of 31 bank branches showed that relaxed and ergonomic office design stimulate the employees and increased their performance significantly. A 16-year study by Idea

Champions discovered that only 3 percent of individuals came up with their best ideas at work (Evans & Johnson, 2000). The other 97 percent said their ideas come in the shower, on vacation, or doing nothing (Evans & Johnson, 2000).

Steelcase Workplace Index survey (released Dec. 1, 1999) revealed that, 56% of the office employees responding said that reduced lighting in the workplace environment caused them exhausted or irritation of eyes, while another 30% said headache is caused by poor lighting. Therefore, to improve productivity daylight was used. Furthermore indirect and direct electrical lighting were used in combination maintain an even, glare-free environment, while for specific tasks, task lighting was added (Steffy, 2002). Slater (1984) found that most powerful impact on performance was of the task lighting as compared to down lighting and side lighting. The office environments should enable the workers to have an access to natural light and outside views. Knisley (2005) established that in latest active workplace, employees perform wide variety of duties (tasks) during a usual day. Increased illumination is required for reading papers with small text, medium light for meetings, and an even lower level is needed for keyboard tasks on a PC. In addition, based on age, vision, or preference each employee's personal light requirements may differ significantly. The open office area would have overhanging lighting that would provide mainly indirect lighting. It also provides some direct lighting to create an even, glare-free environment. A study conducted by the Commission for Architecture & the Built Environment and the British Council for Offices found that few simple things like high-quality lighting and sufficient daylight can lessen absenteeism by 15 percent and enhance productivity by between 2.8 per cent and 20 per cent (Amble, 2005). Windows have also been found to play an important role in employee anxiety. Job dissatisfaction and depression

among employees is related to lack of windows in the workplace. Certain factors which can neutralize the negative impact of job stress include view of natural elements such as trees, vegetation, plants, and foliage (Leather & Di Beals, 1998).

Cooper, Dewe, and O'Driscoll (2001) found that condition of noise in the workplace can have an intense effect on a worker's physical and mental welfare. Random noise increases arousal levels of employees but such noises also require more concentration and leads to distraction of employees. Ringing of Telephones, doors knocking, ringing of mobile phones and the noise created by the students and working staff is termed as unpredictable noise. A performance level of workers in an organization decreases in extremes of temperature. That is, there is an ideal temperature or range of temperature for maximum performance. Especially when considering the effects of temperature on physical performance although the link is less obvious when effects on mental performance are taken into consideration. Or, there is a wide range of temperature that allows best mental performance. Regardless of this result, building management systems are characteristically operated to gain a narrow range of 'acceptable' temperatures in the office environment. Wyon (1974) found that with a rise in temperature from 20°C to 24°C type writing speeds were approximately decreased by 40-50%. In a study carried on later, Wyon (1974) concluded that certain office-based tasks can be improved by temperatures up to 26°C. When other tests were performed like creativity assessment, spelling, vocabulary and manual dexterity, no major difference in performance was found when the temperature levels were changed within a wide range. The above research shows that, the 'ideal' temperature for a specific (office based) activity is specific for only the same activity (office based)– or, occupiers are more resistant than expected and therefore can tolerate a broad range of temperatures. Majority of health

research has focused the relationship between Building Related Illnesses (BRI) and indoor ventilation and heat. Building Related Illness can be very risky to an organization, especially when symptoms are associated with decreased work performance, absenteeism, or temporary leaving of the building. One of the motivating forces behind the sustainable design movement is the enhancement of indoor ventilation.

Movable and adjustable furniture is important for developing/expanding businesses within restricted space; you can simply rearrange cubicles, workstations and reconfigure office to have room for growth. Movable furniture can provide flexibility in terms of accommodating gatherings of different sizes and to adjust more simply to future changes (Sterk, 2005). To avoid early substitution, The furniture should be very durable.

Space ergonomics have a great influence on employee productivity. According to the Chartered Institute of Personnel and Development (CIPD) (2008), back pain is the fourth reason for short absence of non-manual workers. Social spaces in an office environment, also known as break out spaces, are necessary for satisfying the psychological and functional needs of employees (Knight & Haslam, 2010). Office environments generally have various spaces, each supporting a different set of work tasks (Duffy, Jaunzens, Laing, & Willis, 1998). Therefore, the function of each space varies. For instance, social space may be allotted for lunch time, or informal meetings with co-workers or clients. To be able to accommodate the most people and widest variety of functions, workspaces require appropriate space programming (Salama & Adams, 2003). For instance, if there is no space for lunch time, employees are most likely to find this space outside the office, perhaps even outside the building. This may cause employees to return to their job tasks late, thus decreasing their productivity.

Theoretical framework

The following figure shows the relationship between workspace design and productivity.

(Insert Figure 1 here)

Hypothesis

Study is based on following hypotheses:

- H1: Furniture has positive impact on employees' productivity
- H2: Noise affects the employees' productivity
- H3: Thermal Comfort affects the employees' productivity in positive manner.
- H4: Lighting and employees' productivity are positively related.
- H5: Spatial arrangements have positive impact on employees' productivity.

Methodology

This was a quantitative study in which data was collected using simple random sampling technique from three public sector universities in Hazara division (two campuses Hazara University Mansehra, UET campus Abbottabad and University of Haripur). Unit of analysis of this cross sectional study was the individual unit. Population of the study was the officers (Faculty and admin) above grade 17. Total of population of the study was 1320 and sample size was calculated using sample size calculator developed by creative research systems, (2003) USA. The result yielded by the calculator was 298 at 99% confidence level. Questionnaires were used to collect the data. A questionnaire was adapted from previous study of Amjad and Hameed (2009). The Questionnaire consisted of 24 questions; 4 questions on each variable. Out of 298 questionnaires, 250 questionnaires were filled completely and considered for data analysis. The response rate remained 83% . The reliability of each construct was examined with Cronbach's alpha. All the values are above the threshold value 0.7.

(Insert Table 1 here)

Analysis and Results

Correlation and regression analysis were performed to check the relationship of independent and dependent variables. Table 2 shows the summary of correlation.

(Insert Table 2 here)

From the table we can see the Productivity of employees working in Universities is significantly correlated with furniture. Although the magnitude of the relationship is low i.e. 0.229 as compared to other variables in the study but still this relationship is significant relationship at 1 % level of confidence. This relationship is also significant at 1 % level of significance. We can see from the table that productivity and temperature are also correlated with each other and this data proves that it is the most effective variable as far as the current study is the concern. Its magnitude of 0.411 is more than every other variable under study. This variable is also significantly correlated with productivity of the employees at 1 % level of confidence. The correlation table also reveals that Productivity has positive significant correlations with Lighting having magnitude of 0.338 and with Spatial Arrangements having magnitude of 0.39. From the table we can see all the correlations are positive meaning that better the condition of the each variable will be, better will be the productivity of the employees working. Secondly all the relationships are significant with 99 % confidence and 1 % margin of committing type I error.

From the model summary of regression analysis, it can be said that R^2 of the model is 27% approximately meaning that all the variables collectively responsible for 27 % variation in the dependent variable. Further the Durbin Watson stat is close to 2 meaning that there are very rare chances of availability of serial correlation.

(Insert Table 3 here)

The ANOVA table shows that model is overall best fit as its F stat is significant because the p-value criterion is well satisfied. It is because that the p-value is less than 0.01. From the coefficient table we can see that the symbols of all the explanatory variables are positive. This regression model confirms the correlation matrix indications and results. The value of the beta co-efficient for furniture is 0.037 meaning that around 3.7% variation in the productivity of the employees is because of availability of the flexible and comfortable furniture. The p-value is also significant so our H1 is accepted. Similarly, the beta co-efficient for noise, lightening, and spatial arrangements are 0.181, 0.059 and 0.240 represent that the change in productivity of the employees is approximately 18 % due to noise control 5.9% due to lightening and 24 % due to spatial arrangement. All these variations are considered to be significant as the p-value criterion is well satisfied and they are less than the level of significance i.e. 0.05. So our hypotheses H2, H4, and H5 are accepted. The value of beta for thermal comfort is positive but non-significant. So H3 is rejected. This can be due to moderate weather of Hazara division and data was collected from three universities of Hazara division.

(Insert Table 4&5 here)

Research findings and discussion

The study depicted that independent variables (i.e. Furniture, Noise, Thermal Comfort, Spatial Arrangements and Lighting) are responsible for bringing 26.9% variability in the dependent variable (i.e. productivity) i.e. $R^2 = 0.269$. The study also found out that furniture has positive impact on it is 0.037 ($\beta=0.037$, $p<0.05$, $r=0.229$, $p<0.01$). Further we can comment in this regard that moveable furniture arrangement is a good idea for growing commercialism attitude of different university in Hazara. With limited space; one can easily reconfigure workplaces, office, laboratories, and classrooms. Also one

can rearrange his / her office to have room for growth, partition in departments, or isolated equipment areas and other noisy areas of the University. Early replacement of the furniture can be avoided by choosing furniture which is the extremely durable. Second hypotheses suggested the existence of positive relationship between noise and productivity, which was proved to be correct in its very nature ($\beta=0.181$, $p<0.05$, $r=0.385$, $p<0.01$). Random noise increases arousal levels but such noises increase the need for more attention and make the workers easily distracted. Telephones and mobile phones ringing and the noise created by students and working staff all can be grouped together as unpredictable noise (random), unless they are of normal frequency not effecting the attention of employees.

Third hypothesis proposed in current research was rejected and this study found insignificant relationship between thermal comfort and employees' productivity. This can be due to the fact that the temperate in Hazara division is moderate throughout the year. The existence of significant and positive relationship between spatial arrangements and productivity ($\beta=0.240$, $p<0.05$, $r=0.338$, $p<0.01$) and lighting and productivity ($\beta=0.059$, $p<0.05$, $r=0.390$, $p<0.01$).

Based on the research cited and data results of this study it is concluded that the environment in which employees work daily, affects their physical and mental health there by affecting productivity. Therefore business community should be properly educated to realize the benefits of provision of an improved work environment to increase productivity as well-qualified employees can be retained by better working environments. An important aspect of the workspace that this research has deemed important is the control that employees have on their work environment. Personal storage was among the issues raised. Such issues have proven to be a threat to communications between employees and their employers. In order to instill and maintain a sense of pride,

ownership among employees, and loyalty to the organization or office, interaction and consultation between staff is crucial. Employee involvement should nonetheless be relatively controlled as employees may not have realistic expectations. Yet, employers must continuously consider the needs of employees in order to overcome economics and organizational challenges. The fact that architects design environments for people mandates that the environment they work form should also be responsive. In addition the community should realize the importance of using furnishing and finishing materials which is not hazardous for environment. Such material is now widely available. Using environmentally safe material is on one hand beneficial for employees on the other hand it protects the global ecosystems. The company that provides better work environment improves wellbeing of its employees thus enhancing productivity and on the other hand decreases its healthcare costs. Moreover, it will set an example in the society as an environmentally responsible member of that society.

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APPENDIX

Figure 1, Theoretical Framework

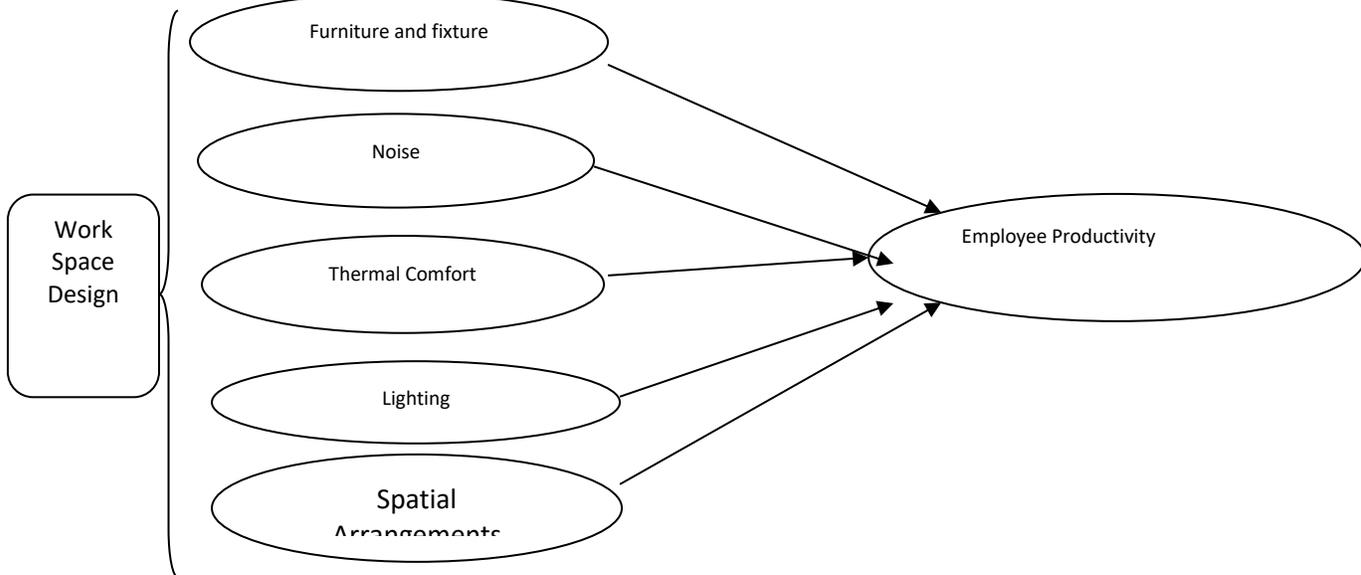


Table 1, Cronbach's Value

Variable	No. of Items	Cronbach's Alpha
FURNITURE	04	.842
NOISE	04	.936
TEMPRATURE	04	.863
LIGHTING	04	.799
SPATIAL ARRANGEMENTS	04	.839
PRODUCTIVITY	04	.867

Table 2, Correlation Matrix

		PRODUCTIVITY	FURNITURE	NOISE	TEMPERATURE	LIGHTING	SPATIAL ARRANGEMENTS
PRODUCTIVITY	Pearson Correlation	1					
	Sig. (2-tailed)						
FURNITURE	Pearson Correlation	.229**	1				
	Sig. (2-tailed)	.000					
NOISE	Pearson Correlation	.385**	.573**	1			
	Sig. (2-tailed)	.000	.000				
TEMPERATURE	Pearson Correlation	.411**	.268**	.549**	1		
	Sig. (2-tailed)	.000	.000	.000			
LIGHTING	Pearson Correlation	.338**	.131*	.302**	.494**	1	
	Sig. (2-tailed)	.000	.039	.000	.000		
SPATIALARRANGEMENTS	Pearson Correlation	.390**	.124	.261**	.358**	.531**	1
	Sig. (2-tailed)	.000	.051	.000	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 3, Model Summary^b

Model	R	R Square	Adjusted R Square	SE of Estimate	Durbin-Watson
1	.518 ^a	.269	.254	.51606	1.757

3. Predictors: (Constant), FURNITURE, SPATIALARRANGEMENTS, TEMPRATURE, LIGHTING, NOISE b. Dependent Variable: PRODUCTIVITY

Table 3, Model Summary^b

Model	R	R Square	Adjusted R Square	SE of Estimate	Durbin-Watson
1	.518 ^a	.269	.254	.51606	1.757

3. Predictors: (Constant), FURNITURE, SPATIALARRANGEMENTS, TEMPRATURE, LIGHTING, NOISE b. Dependent Variable: PRODUCTIVITY